

incorporated into the present application by reference, is programmable and consists of addressable microlocations, such that the microlocations of the present invention could be described as programmable. Because, however, the term “electronically addressable” is used consistently in the specification in conjunction with the term “microlocations,” Applicants have amended the independent claims from the above group, i.e., claims 1, 14, 21, and 28, to avoid any possible ambiguity. Specifically, Applicants replaced the phrase “programmable microlocations” with “electronically addressable microlocations.” Because these amendments specifically address the Examiner’s concerns, Applicants request that the Examiner reconsider and withdraw these rejections.

Rejections under 35 U.S.C. § 112 for indefiniteness of the term “electronic addressability”

The Examiner rejected claims 1-19, 21-26, 28-39, and 67-89 as indefinite for failing to define the phrase “electronically addressable” used in the first line of the claims to describe the microchip device. Specifically, these claims are asserted to be indefinite “because the remainder of the claim which recites the actual contents of the microarray fails to indicate any addressability.” Applicants have amended the relevant independent claims, as described above, to include “a plurality of electronically addressable microlocations” such that it is now more clear that the contents of the microarray are addressable.

In addition, it is asserted that these claims are indefinite because “electronic addressability” is not sufficiently defined. Read in light of the specification and the general knowledge of the person of ordinary skill in the art, the meaning of the term “electronic addressability” is clear. As discussed above, on page 4, lines 4-6 of the specification Applicants define the term “microarray” as an electronically addressable microarray such as that described in U.S. Patent No. 5,632,957, which is incorporated into the present application by reference.

The '957 patent thoroughly explains that “electronic addressability” refers to the relocation of specific binding entities, such as biomolecules, to a specific microlocation by electrophoretically transporting the specific binding entities through the solution in which the microlocations are immersed to a microlocation with an underlying electrode that has a charge opposite that of the specific binding entity. See column 7, lines 66-67, column 8, and column 9, lines 1-28 of U.S. patent 5,632,957.

Finally, claims 6, 19, 26, 35, and 39 are allegedly indefinite because they “indicate a type of potential or biasing which is electronically generated but without defining what addressing has occurred.” The “addressing” that occurs when an “electronic potential” is applied to one or more electrodes of the microarray is described in the specification: page 7, lines 26-31, page 8, lines 1-3 and lines 24-30; and page 20, lines 4-17. Specifically, in the specification Applicants describe applying an electronic potential to one or more of the electrodes to affect the pH of a solution directly above a particular microlocation or particular microlocations. Based on the amendment described above and the definitions of electronic addressability provided in the specification, Applicants request that this rejection be reconsidered and withdrawn.

Rejections under 35 U.S.C. § 112 for indefiniteness of the P-X-R formula

The Examiner rejected claims 1, etc. as indefinite because they contain a formula for P-X-R that provides two additional bonds to P, while the definition of P in the claims describes one or more moieties binding to P. The Examiner asserts that, according to the formula, if P were to bind to only one moiety, an unused, unstable bond would remain, and if P were to bind to more than two moieties, the formula would not provide a sufficient number of bonds for every moiety. Although when the claims are read in light of the specification it is clear that where P binds only

to one moiety the second available bond shown in the structural figure does not exist, Applicants have amended the claims to resolve any possible ambiguity. Specifically, Applicants have amended the structural figure by replacing one of the solid lines with a dashed line to show that the second bond is optional, existing only where P binds to two moieties. In addition, Applicants have amended the wording of the definition of P in the relevant claims to clarify that the P in the P-X-R formula can bind to either one or two moieties. Therefore, Applicants request that the Examiner reconsider and withdraw these rejections.

Conclusions

Applicants submit that the claims, as amended, are free of the cited art and are in position for allowance. Any fees required by this submission may be charged to deposit account 12-2475. If the Examiner has any questions regarding this communication, or feels that an interview might facilitate prosecution of the application, he is invited to contact the undersigned at (949) 567-2305.

Respectfully submitted,

LYON & LYON LLP

Dated: January 23, 2002

By: 

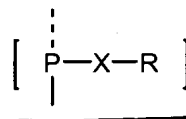
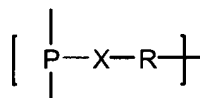
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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

1. (TWICE AMENDED) An electronically addressable microchip device comprising a plurality of electronically addressable ~~programmable~~ microlocations, wherein the microlocations each comprise an underlying working microelectrode on a substrate, wherein at least some of the microelectrodes are covered by a permeation layer comprising at least first chemical group for attaching to the microarray biomolecules, the first group having the formula:



wherein,

P is a polymerizable moiety covalently attached to one or two moieties selected from the group consisting of: a monomeric unit of the permeation layer and another P-X-R group, matrix and/or covalently attached to one or more other P-X-R groups, as defined herein, wherein the other P-X-R group may be the same as or different from the first P-X-R group, further wherein the dashed line is a covalent bond to the second moiety if P is covalently attached to two moieties;

X is a covalent bond or a linking moiety; and

R is a functional moiety for attaching, either covalently or non-covalently, a derivatized biomolecule, or for attaching covalently another ~~an other~~ P-X-R group, as defined herein, wherein the other P-X-R group may be the same as or different from the first P-X-R group, and wherein R may, optionally, be attached to a biomolecule or another ~~an other~~ P-X-R group.

14. An electronically addressable microchip device comprising a plurality of electronically addressable ~~programmable~~ microlocations, wherein the microlocations each comprise an underlying working microelectrode on a substrate, wherein at least some of the

microelectrodes are covered by a permeation layer comprising first and second chemical groups having the formula



wherein,

the dashed line is a covalent bond to a second moiety if P is covalently attached to two moieties

P is a polymerizable moiety,

X is a linking moiety selected from the group consisting of a covalent bond, an alkyl group of 1-10 carbon atoms, an alkenyl group of 2-10 carbon atoms, alkyl esters, ketones, ethers amides, thioesters, amido groups, and carbonyls, and any combinations thereof; and

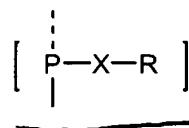
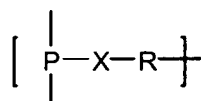
R is a functional moiety for attaching, either covalently or non-covalently, a derivatized biomolecule;

wherein the first and second P-X-R groups may be the same or different;

wherein the **P** moieties of the first P-X-R groups are covalently attached to the permeation ~~permeation~~ layer matrix and to ~~at least one P~~ of the second P-X-R groups;

and wherein the **P** moieties of the second P-X-R groups are covalently attached to ~~at least one or two other P moieties moiety of other another~~ second P-X-R groups to form a polymer of the second P-X-R groups.

21. (TWICE AMENDED) An electronically addressable microchip device comprising a plurality of electronically addressable ~~programmable~~ microlocations, wherein the microlocations each comprise an underlying working microelectrode on a substrate, wherein at least some of the microelectrodes are covered by a permeation layer comprising first P-X-R groups and second P-X-R groups having the formula:



wherein,

the dashed line is a covalent bond to a second moiety if P is covalently attached to two moieties;

P is a polymerizable moiety,

X is a linking moiety selected from the group consisting of a covalent bond, an alkyl group of 1-10 carbon atoms, an alkenyl group of 2-10 carbon atoms, alkyl esters, ketones, ethers amides, thioesters, amido groups, and carbonyls, and any combinations thereof; and

R is a functional moiety for attaching, either covalently or non-covalently, a derivatized biomolecule;

wherein the first and second P-X-R groups may be the same or different;

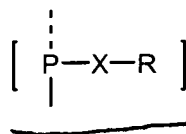
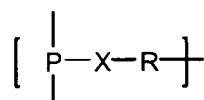
wherein the **P** moieties of the first P-X-R groups are covalently attached to the permeation layer matrix

wherein the **R** of the first P-X-R group is covalently attached to at least one **P** of the second P-X-R groups;

and wherein the **P** moieties of the second P-X-R groups are covalently attached to one or two at least one other P moieties of other another second P-X-R groups to form a polymer of the second P-X-R groups.

28. (TWICE AMENDED) An electronically addressable microchip device comprising a plurality of electronically addressable programmable microlocations, wherein the microlocations each comprise an underlying working microelectrode on a substrate, wherein at least some of the microelectrodes are covered by a permeation layer comprising a first P-

X-R groups attached to one or two moieties selected from the group consisting of biomolecules and and/or to polymerized monomer units comprising second P-X-R groups, wherein the polymerized second P-X-R groups are further attached to biomolecules, wherein the attachment of the biomolecules to the first P-X-R groups or to the polymerized second P-X-R groups requires activation of at least one of the first and/or the second P-X-R groups under acidic and/or basic pH conditions, wherein the first and second P-X-R groups have the formula



wherein,

the dashed line is a covalent bond to a second moiety if P is covalently attached to two moieties;

P is a polymerizable moiety, wherein;

X is a linking moiety moieties selected from the group consisting of a covalent bond, an alkyl group of 1-10 carbon atoms, an alkenyl group of 2-10 carbon atoms, alkyl esters, ketones, ethers amides, thioesters, amido groups, and carbonyls, and any combinations thereof; and

R is a functional moiety for attaching, either covalently or non-covalently, a derivatized biomolecule or for attaching covalently an other P-X-R group;

wherein **P** comprises a chemical element requiring activation for attaching to the permeation layer and/or to a **P** of an other P-X-R group;

and wherein **R** comprises chemical elements requiring activation different from **P** of

either the first or second P-X-R groups for attaching the biomolecules, or to **P** of another P-X-R groups.